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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,968	05/11/2001	Tsuguo Maru	P/1905-102	8109

32172 7590 08/24/2004

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EXAMINER	
MEEK, JACOB M	
ART UNIT	**PAPER NUMBER**
2637	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/853,968	MARU, TSUGUO	
	Examiner	Art Unit	
	Jacob Meek	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 - 28 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 - 28 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1 - 21, and 25 - 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Van Stralen et al (US Patent 6,304,996).

NOTE: Responses are grouped by independent claims.

With regard to claim 1, Van Stralen teaches a high-speed turbo decoder using a BCJR algorithm means for supplying pipelined stages of gamma metrics (see Figures 1 - 3, and Brief Summary); ACS computation means constituted of stages of cascade connections which receives the pipelined gamma metrics (see Figure 2, 4A and 4B for computation unit); means for receiving a computation result obtained by ACS computation means and updating state metrics of stages (K stages) (see Figures 3); and means for storing state metrics for every K stages (see Figure 3, Update α / β Blocks).

With regard to claim 2, Van Stralen teaches the limitations of Claim 1 plus state metric updating means is of a sliding window type, and state metrics are stored in a window for every K stages (See Figure 3, and column 7, lines 36 - 49).

With regard to claim 7, Van Stralen teaches the limitations of Claim1 plus out of stages of computations by ACS computation means constituted of the stages of cascade

connections, computation at first stage becomes addition, and second and subsequent stages become computations each constructed by a trellis structure constituted of parallel components (see column 7 lines 50 – 58).

With regard to claim 8, Van Stralen teaches the limitations of Claim 2 plus limitations of claim 7 above.

With regard to claim 9, Van Stralen teaches the limitations of Claim 1 plus means for updating the state metrics every stage (K stages) is adapted to receive computation results, as inputs (see Figure 4A, 4B, and Column 7, line 64 – Column 8, line16), sent from all nodes indicating states before updating to the respective nodes indicating states after updating and receive computation results obtained by ACS computation means, as second inputs, constituted of the plurality of stages of cascade connections, whereby ACS computation based on inputs corresponding to the number of nodes indicating states is performed (see Figure 5A).

With regard to claim 10, Van Stralen teaches the limitations of Claim 2 and limitations of Claim 9 above.

With regard to Claim 11, Van Stralen teaches the limitations of Claim 7 and the limitations of Claim 9 above.

With regard to Claim 17, Van Stralen teaches the limitations of Claim 1 and parallel concatenation encoding method is used as a turbo code encoding method (see Column 3, line 48 – Column 4, line 3).

With regard to Claim 25, Van Stralen teaches the limitations of Claim 1 plus the limitation of correction values based on a Jacobian logarithm are added (see Figure 11, log addition blocks).

With regard to Claim 3, Van Stralen teaches a high-speed turbo decoder using a BCJR algorithm means for supplying pipelined stages of gamma metrics (see Figures 1 - 3, and Brief Summary); ACS computation means constituted of stages of cascade connections which receives the pipelined gamma metrics (see Figure 2, 4A and 4B for computation unit); means for receiving a computation result obtained by ACS computation means and updating state metrics of stages (K stages) (see Figures 3); ACS computation means of a plurality of stages of cascade connections which receives state metric updating results for every K stages and a plurality of pipelined stages of gamma metrics (see Figure 5A), wherein likelihood computation is performed on the basis of a computation result obtained by each stage of said ACS computation means constituted of the cascade connections (see Figure 9 – 11).

With regard to Claim 4, Van Stralen teaches the limitations of Claim 3 plus the limitation of computation results obtained by the stages of another ACS computation means constituted of cascade connections (see Figure 3, 42 and 43) which receives state metric updating results for every K stages and gamma metrics at the plurality of pipelined stages are computation results on state and gamma metrics used in the ACS computation. and thereby performing likelihood computation on the basis of the computation results (see figure 11).

With regard to Claim 12, Van Stralen teaches the limitations of claim 3 plus the limitation of plural stages of computations by ACS computation means constituted of the plurality of stages of cascade connections which receives the plurality of pipelined stages of gamma metrics, computation at a first stage becomes addition (see Figure 11, block 62), and a second and subsequent stages become computations by said ACS computation means each constructed by a trellis structure constituted of parallel components (see Figure 11, block 48).

With regard to Claim 13, Van Stralen teaches the limitation of Claim 4 plus the limitation as recited in Claim 12 above.

With regard to Claim 14, Van Stralen teaches the limitations of claim 3 plus the additional limitation of means for updating the state metrics every plurality of stages (K stages) is adapted to receive computation results (see Figure 3, Update α / β Blocks, Figure 4A, 4B), as first inputs, sent from all nodes indicating states before updating to the respective nodes indicating states after updating and receive computation results obtained by ACS computation means, as second inputs, constituted of the stages of cascade connections (see Figure 5B, block 77 represents storage / clocking element), whereby ACS computation based on inputs corresponding to the number of nodes indicating states is performed (see Figure 11).

With regard to Claim 15, Van Stralen teaches the limitations of claim 4 plus the limitation as recited in claim 14 above.

With regard to Claim 16, Van Stralen teaches the limitations of claim 12 plus the limitation as recited in claim 14 above.

With regard to Claim 18, Van Stralen teaches the limitations of Claim 3 plus the limitation as recited in claim 17 above.

With regard to Claim 26, Van Stralen teaches the limitations of Claim 3 plus the limitation as recited in Claim 25 above.

With regard to Claim 5, Van Stralen teaches a means for receiving values of stored state metrics for every plurality of stages (K stages) as first inputs and thereby supplying a plurality of pipelined stages of gamma metrics (see Figure 3); and ACS computation means constituted of a plurality of stages of cascade connections which receives the plurality of pipelined stages of gamma metrics as second inputs (see figures 4B, 4B), wherein likelihood

computation is performed on the basis of computation results at the respective stages of said ACS computation means constituted of the cascade connections (see Figure 5A – 5C).

With regard to Claim 19, Van Stralen teaches the limitations of Claim 5 plus the limitation as recited in claim 17 above.

With regard to Claim 27, Van Stralen teaches the limitations of Claim 5 plus the limitation as recited in Claim 25 above.

With regard to Claim 6, Van Stralen teaches a first section to perform at least one of alpha metric computation and beta metric computation in the BCJR algorithm: means for supplying a plurality of pipelined stages of gamma metrics (See Figure 3); ACS computation means constituted of a plurality stages of cascade connections which receives the plurality of pipelined stages of gamma metrics (see Figure 4A and 4B); means for receiving computation results obtained by said ACS computation means and thereby updating state metrics every plurality of stages (K stages) (see Figures 5A – 5C); and means for storing the state metrics for every plurality of stages (See Figure 6), a second section to perform the other one of alpha metric computation and beta metric computation (see Figure 4A and 4B) in the BCJR algorithm: means for supplying a plurality of pipelined stages of gamma metrics (see Figure 6); ACS computation means constituted of a plurality of stages of cascade connections which receives the plurality of pipelined stages of gamma metrics (see Figures 5A – 5C); means for receiving computation results obtained by said ACS computation means and thereby updating state metrics every plurality of stages (K stages) (see Figures 9 – 11); and another ACS computation means constituted of stages of cascade connections which receives state metric updating results for every K stages and the pipelined stages of gamma metrics (see Figure 11); wherein a computation result in each stage of another ACS computation means constituted of the cascade connections becomes first input for likelihood computation (see

Figure 8A and 8B); and a third section for supplying a plurality of pipelined stages of gamma metrics (see Figure 6); and still another ACS computation means constituted of a plurality of stages of cascade connections which receives values of the stored state metrics for every K stages as first inputs and receives the plurality of pipelined stages of gamma metrics as second inputs; wherein a computation result in each stage of said still another ACS computation means constituted of the cascade connections becomes a second input for likelihood computation, thus the likelihood computation is performed while the first and second inputs for the likelihood computation are synchronized with each other by using delay means (see Figure 11).

With regard to Claim 20, Van Stralen teaches the limitations of Claim 6 plus the limitation as recited in claim 17 above.

With regard to Claim 28, Van Stralen teaches the limitations of Claim 6 plus the limitation as recited in Claim 25 above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 21 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Stralen et al (US Patent 6,304,996) in view of Smith et al (US Patent 6,304,995).

With regard to Claim 21, Van Stralen teaches the limitations of Claim 1 above. Van Stralen fails to teach the limitation of serial concatenation encoding. Smith teaches a parallel or serial concatenation methodology. It would have been obvious to one of ordinary skill in

the art to combine Van Stralen's invention with Smtih's invention to create a system of reduced Hardware complexity and lower power consumption than when implementing a parallel concatenation encoder.

With regard to Claim 22, Van Stralen teaches the limitations of Claim 3 as above with the additional limitation as taught by Smith as above in Claim 21. Motivation to combine as discussed above in Claim 21.

With regard to Claim 23, Van Stralen teaches the limitations of Claim 5 – 10 as above with the additional limitation as taught by Smith as above in Claim 21. Motivation to combine as discussed above in Claim 21.

With regard to Claim 24, Van Stralen teaches the limitations of Claim 6 with the additional limitation as taught by Smith as above in Claim 21. Motivation to combine as discussed above in Claim 21.

TEMESGHEN GHEBRETINSAE
PRIMARY EXAMINER
8/24/04